Biological and Water Quality Characteristics of Streams Proposed for the Antidegradation Category of Exceptional Waters

A Supplement to the 2018 Triennial Review
Proposed Water Quality Standards
401 KAR 10:030

The following is a compilation of information on twenty-nine streams or stream segments proposed for Exceptional Water categorization under 401 KAR 10:030 Section 1(2)(a)3 for an "excellent" fish or macroinvertebrate community. The procedures for Exceptional Water re-categorization are followed as described in 401 KAR 10:030 Section 2(4)(b) and documented herein. The information in this narrative is presented in a consistent manner for each stream or segment.

Ranking of a fish community as "excellent" followed the procedures described in *Development and Application of the Kentucky Index of Biotic Integrity (KIBI)*, DOW 2003. This document and KIBI template are available under the header "Index Calculation Documents" at: http://water.ky.gov/Pages/SurfaceWaterSOP.aspx. Fish metrics used to calculate the KIBI are included in a table below the information for each stream or stream segment proposed for Exceptional Water categorization due to an excellent fish community. Fish metric acronyms, along with a brief description of each, and a map of Ichthyoregions are provided below.

Fish Metric Acronyms

TNI: Total Number of Individuals: The total number of individual fish counted in the sampling process.

NAT: Native Species Richness. The total number of native species present in a sample. NAT has poor sensitivity in headwater streams and is only used in wadeable streams.

DMS: Darter, Madtom, and Sculpin Richness. The total number of the species present in a sample within the tribe Etheostomatini (darters), the genus Noturus (madtoms), and the genus Cottus (sculpins). These groups, relatively, are intolerant or sensitive to pollution.

INT: Intolerant Species Richness. The total number of intolerant species present in a sample. Members of this metric are believed to represent the first species to disappear after impairment and the last to reestablish after restoration.

SL: Simple Lithophilic Spawning Species Richness. This metric represents the total number of species that require relatively clean gravel and exhibit simple spawning behavior. The metric is considered a habitat metric and is expected to decline with impairment and be particularly sensitive to siltation.

% INSCT: Relative Abundance of Insectivorous Individuals. The relative abundance of insectivorous individuals excluding tolerant individuals.

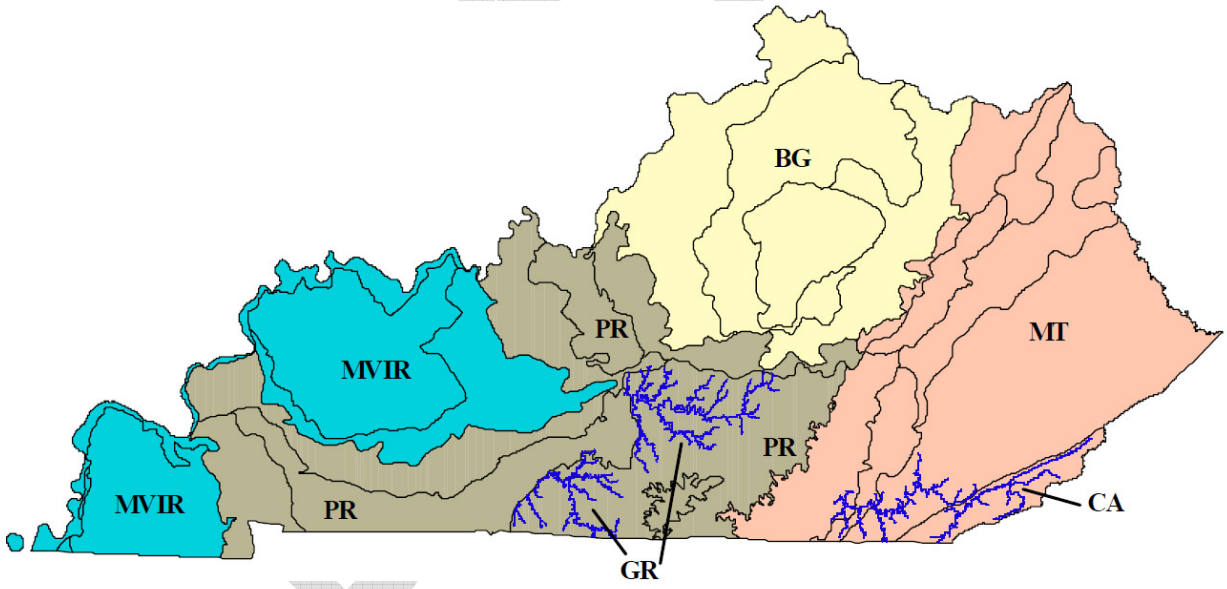
% TOL: Relative Abundance of Tolerant Individuals. This metric represents a proportion of individuals that are pollution tolerant and increase in abundance with impairment (negative response).

% FHW: Relative Abundance of Facultative Headwater Individuals. This metric is designed to detect the abundance of species that are atypical of headwater streams or typically exhibit low abundance in small streams, but tend to increase in abundance with impairment (negative response). This metric replaces NAT in headwater streams.

KIBI: Kentucky Index of Biotic Integrity. The KIBI is a model for evaluating stream health based on fish communities, and as with most bioassessment models, it was designed to be a tool to gauge stream health.

Ichthyoregion Location

For purposes of KIBI ranking, six ichthyoregions, developed to incorporate ecological region and basin similarities or differences, are defined for Kentucky.



BG= Bluegrass, CA= Cumberland River above Cumberland Falls, GR= Upper Green River, MT= Mountain, MVIR= Mississippi Valley-Interior River, PR= Pennyroyal. Note GR and CA Ichthyoregions are river basins within larger Ichthyoregions.

Ranking of a macroinvertebrate community as excellent followed the procedures described in *The Kentucky Macroinvertebrate Bioassessment Index*, KDOW 2003. This document and Macroinvertebrate Bioassessment Index (MBI) templates are available under the header "Index Calculation Documents" at: http://water.ky.gov/Pages/SurfaceWaterSOP.aspx. Macroinvertebrate metrics used to calculate the MBI are included in a table below the information for each stream or stream segment proposed for Exceptional Water categorization due to an excellent macroinvertebrate community. Macroinvertebrate metric acronyms, along with a brief description of each, and a map of Macroinvertebrate Bioregions are provided below.

Macroinvertebrate Metric Acronyms

Tot Ind: Total number of Individuals. The total number of individual macroinvertebrates counted in the sampling process.

G-TR: Genus Taxa Richness. The total number of genera present in the sample. In general, increasing taxa richness reflects increasing water quality, habitat diversity or habitat suitability.

G-EPT: Genus Ephemeroptera, Plecoptera, and Trichoptera Richness. The total number of distinct genera within the generally pollution sensitive insect orders of Ephemeroptera, Plecoptera and Trichoptera found in the sample. This metric will generally increase with increasing water quality, habitat diversity or habitat suitability.

mHBI: Modified Hilsenhoff Biotic Index. The HBI was originally developed to assess organic enrichment by summarizing the overall pollution tolerance of a benthic arthropod community with a single value. The mHBI is used to assess impacts other than organic enrichment. An increasing mHBI value indicates decreasing water quality.

m% EPT: Modified Percent EPT Abundance. This metric measures the abundance of the generally pollution-sensitive insect orders of Ephemeroptera, Plecoptera and Trichoptera. Increasing m%EPT values indicate increasing water quality and/or habitat conditions.

% Ephem: Percent Ephemeroptera. The relative abundance of mayflies is calculated to detect impacts of metals and high conductivity. Ephemeroptera abundance normally declines in the presence of brine and metal contamination, as well as increased conductivity from a variety of disturbances. This metric is used only in headwater stream assessment since those mayfly species indigenous to smaller streams appear most sensitive.

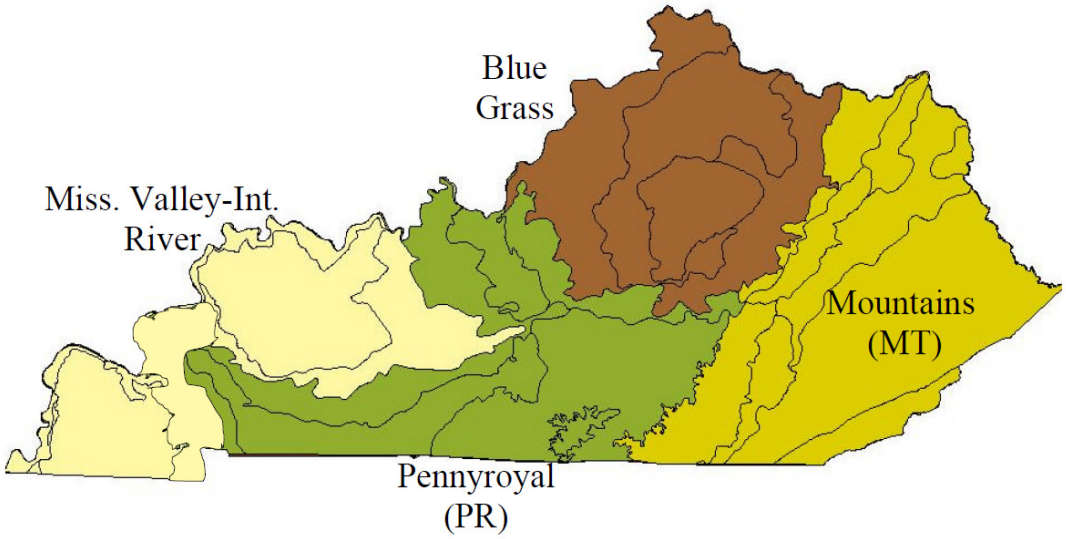
% C+O: Percent Chironomidae and Oligochaeta. This metric measures the relative abundance of these generally pollution tolerant organisms. Increasing abundance of these groups suggests decreasing water quality conditions.

% ClngP: Percent Primary Clingers. This habit metric measures the relative abundance of those organisms that need hard, silt-free substrates on which to "cling". Increasing metric values indicate increasing substrate stability.

MBI: Macroinvertebrate Bioassessment Index. The MBI is a model for evaluating stream health based on macroinvertebrate communities. It was designed to distinguish between reference and non-reference communities across regional scales and to rank the quality of stream reaches.

Macroinvertebrate Bioregion Location

For purposes of MBI ranking, four bioregions, developed to incorporate similarity among biological assemblages across geographic scales, are defined for Kentucky.



The following segments are proposed for Exceptional Water categorization due to an excellent macroinvertebrate or fish community:

Bear Creek (GNIS ID 510462) river miles 0.0 to 3.3, from mouth to Kentucky/Tennessee border, Upper Cumberland River Basin, McCreary County.

Receiving Stream: Big South Fork Cumberland River at river mile 49.5

Map: Please see the attached Map 1 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: Sixty-nine percent of the Bear Creek watershed is within Tennessee. Of the land within Kentucky, 94% is forest use and 3.7% is developed (mostly roads). Logging is evident in the area between Turkey Branch and Bear Creek. The land use adjacent to the proposed exceptional water segment is forested.

Flow Frequency: Bear Creek at river mile 0.0 is perennial with natural flow expected year-round. It has a seven-day, 10-year low flow (7Q10) of 0.3 cfs and a mean annual flow of 35.8 cfs at river mile 0.0.

Biological Data Collection: Bear Creek is located within the Mountain Ichthyoregion. The fish community was sampled by the Tennessee Department of Environment and Conservation for Kentucky's nonpoint source (NPS) program in 2009. The catchment area above the sample reach was 23.3 square miles, which is defined as a wadeable stream. Bear Creek from its mouth to the Kentucky/Tennessee border is an Exceptional Water candidate because of an excellent fish community. It scored an 81 on the Kentucky Index of Biotic Integrity (KIBI), ranking as excellent for a wadeable Mountain Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW02009007	6/30/09	NPS	23.3	132	19	5	7	8	74.24	4.55	74.24	81

KIBI Score	Narrative Translation for Mountain Ichthyoregion
≥71	Excellent
59-70	Good
39-58	Fair
19-38	Poor
0-18	Very Poor

Beech Fork (GNIS ID 486703) river miles 109.7 to 111.8, from Hot Water Creek to headwaters, Salt River Basin, Marion and Boyle Counties.

Receiving Stream: Rolling Fork at river mile 20.2

Map: Please see the attached Map 2 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Beech Fork watershed above river mile 109.7 has a mixture of 49.3% forest and 46.2% agriculture (43.9% pasture/hay and 2.3 % row crop) use, with 2.2 % developed (mainly roads). The land use adjacent to the proposed exceptional water segment is mostly pasture/hay with some forested areas. Additionally, Craintown Road runs within the floodplain adjacent to the stream for most of the proposed segment length.

Flow Frequency: Beech Fork at river mile 109.7 is perennial with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 3.3 cfs at river mile 109.7.

Biological Data Collection: Beech Fork is located within the Bluegrass Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2004. The catchment area above the sample reach was 2.6 square miles, which is defined as a headwater stream. Beech Fork from Hot Water Creek to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 59 on the Macroinvertebrate Bioassessment Index (MBI), ranking as excellent for a headwater Bluegrass stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	%ClngP	MBI
DOW12020006	4/15/04	PRB	2.6	1250	44	12	5.54	47.28	6.08	10.72	73.28	59

MBI Score	Narrative Translation for Headwater Bluegrass Bioregion
≥58	Excellent
51-57	Good
39-50	Fair
19-38	Poor
0-18	Very Poor

Blackford Creek (GNIS ID 487412) river miles 8.1 to 10.15, from Little Yellow Creek to Butchers Branch, Tradewater River Basin, Daviess and Hancock Counties.

Receiving Water: Ohio River at river mile 742

Map: Please see the attached Map 3 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Blackford Creek watershed above river mile 8.1 has 62.6% forest and 27.9% agriculture (14.5 % pasture/hay and 13.4% row crop) use, with 3% developed (mostly roads). Numerous oil and gas wells are within the watershed, most of which are in the south east and above the proposed segment. Several permitted surface mine boundaries exist throughout the watershed, none along the segment proposed for exceptional water categorization. The land use adjacent to the proposed exceptional water segment consists of a forested riparian buffer with row crops or additional forested area beyond the riparian zone.

Flow Frequency: Blackford Creek at river mile 8.1 is perennial with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 110.3 cfs at river mile 8.1.

Biological Data Collection: Blackford Creek is located within the Mississippi Valley/Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2006. The catchment area above the sample reach was 92.8 square miles, which is defined as a wadeable stream. Blackford Creek from Little Yellow Creek to Butchers Branch is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 60 on the MBI, ranking as excellent for a wadeable Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	% ClngP	MBI
DOW10028001	7/18/06	PRB	92.8	379	37	6	6.58	50.13	9.50	56.46	60

MBI Score	Narrative Translation for Wadeable Mississippi Valley/Interior River Lowland Bioregion
≥58	Excellent
48-57	Good
24-47	Fair
13-23	Poor
0-12	Very Poor

Brushy Pond Creek (GNIS ID 488150) river miles 1.4 to 6.0, from Browns Branch to headwaters, Green River Basin, Grayson and Butler Counties

Receiving Water: Caney Creek at river mile 11.85

Map: Please see the attached Map 4 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Brushy Pond watershed above river mile 1.4 is a mixture of 59.6% forest and 27.6% agriculture (23.7% pasture/hay and 3.9% row crop), with 4.7% developed (mostly roads). The Wendell H Ford-Western Kentucky Parkway traverses the lower portion of the watershed. The land use adjacent to the proposed exceptional water segment consists of an excellent forested riparian buffer, several hundred feet in width, with agriculture and grassland beyond the riparian buffer.

Flow Frequency: Brushy Pond Creek at river mile 1.4 is perennial with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 6.5 cfs at river mile 1.4.

Biological Data Collection: Brushy Pond Creek is located within the Mississippi Valley/Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2006. The catchment area above the sample reach was 2.1 square miles, which is defined as a headwater stream. Brushy Pond Creek from Browns Branch to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 72 on the MBI, ranking as excellent for a headwater Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	% ClngP	MBI
DOW03013002	4/11/06	PRB	2.1	1231	35	18	3.61	90.25	21.12	3.49	63.60	72

MBI Score	Narrative Translation for Headwater Mississippi Valley/Interior River Lowland Bioregion
≥63	Excellent
56-62	Good
35-55	Fair
19-34	Poor
0-18	Very Poor

Camp Branch (GNIS ID 511145) river miles 0.0 to 1.1, from mouth to headwaters, Kentucky River Basin, Menifee County.

Receiving Water: Spass Creek at river mile 2.9

Map: Please see the attached Map 5 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: Camp Branch is located within the Daniel Boone National Forest, which allows public hunting. It has 98% forest and 1.7% developed (roads) use. The land use adjacent to the proposed exceptional water segment is forested.

Flow Frequency: Camp Branch at river mile 0.0 is intermittent, with natural flow for approximately five months during December through April. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 0.8 cfs at river mile 0.0.

Biological Data Collection: Camp Branch is located within the Mountains Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2013. The catchment area above the sample reach was 0.26 square miles, which is defined as a headwater stream. Camp Branch from its mouth to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored an 84 on the MBI, ranking as excellent for a headwater Mountain Bioregion stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	% ClngP	MBI
DOW04042026	4/17/13	PRB	0.26	307	43	22.00	2.89	75.24	59.93	7.17	64.82	84

MBI Score	Narrative Translation for Headwater Mountain Bioregion
≥83	Excellent
72-82	Good
48-71	Fair
24-47	Poor
0-23	Very Poor

Dismal Creek (GNIS ID 490906) river miles 0.0 to 3.25, from mouth to headwaters, Green River Basin, Edmonson County.

Receiving Water: Nolin River at river mile 7.5

Map: Please see the attached Map 6 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Dismal Creek watershed has a mixture of 74.6% forest and 14.3% agriculture (13.5% pasture/hay and 0.8% row crop) use, with 4.5% developed (mostly roads). Several permitted surface mine boundaries are within the watershed. The land use adjacent to the proposed exceptional water segment consists of a mixture of forested riparian buffer or agriculture.

Flow Frequency: Dismal Creek at river mile 0.0 is perennial with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 5.9 cfs at river mile 0.0.

Biological Data Collection: Dismal Creek is located within the Mississippi Valley/Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2006. The catchment area above the sample reach was 3.2 square miles, which is defined as a headwater stream. Dismal Creek from its mouth to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 65 on the MBI, ranking as excellent for a headwater Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	% ClngP	MBI
DOW03025018	4/5/06	PRB	3.2	1062	38	19	4.21	87.19	9.23	4.14	39.92	65

MBI Score	Narrative Translation for Headwater Mississippi Valley/Interior River Lowland Bioregion
≥63	Excellent
56-62	Good
35-55	Fair
19-34	Poor
0-18	Very Poor

Fishing Creek (GNIS ID 492127) river miles 16.8 to 27.85, from Lake Cumberland to Puncheon Creek, Upper Cumberland River Basin, Pulaski County.

Receiving Stream: Lake Cumberland, Cumberland River at river mile 499.35

Map: Please see the attached Map 7 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Fishing Creek watershed above river mile 16.8 has a mix of 49.2% forest and 40.4% agriculture (39.1% pasture/hay and 1.3% row crop) use, with 4% developed (mostly roads). The land use adjacent to the proposed exceptional water segment consists of forested riparian buffer or agriculture. Part of the Lake Cumberland Wildlife Management Area, a public hunting area, is contained within the lower portion of the watershed near river miles 16.8 to 21.1. One water withdrawal is located on the proposed exceptional water segment at river mile 19.95. Two gas wells are in the proposed segment's floodplain between river miles 25.7 to 26.2. Several roads also either cross the stream channel or are in the floodplain adjacent to the proposed stream segment.

Flow Frequency: Fishing Creek at river mile 16.8 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.6 cfs and a mean annual flow of 125 cfs at river mile 16.8.

Biological Data Collection: Fishing Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Watershed Biological Monitoring (WBM) program during 2000 and the Probabilistic Monitoring (PRB) program during 2010, the Central Fisheries District State Wildlife Grant (SWG) program during 2009, and the Southeastern Fisheries District (SED) during 2010. The catchment area above the sample reaches were 59.8, 57.1, 88, and 88.01 square miles, which are defined as wadeable streams. Fishing Creek from Lake Cumberland backwaters to Puncheon Creek is an Exceptional Water candidate because of an excellent fish community. It scored a 71, 74, 71, and 70 on the KIBI, ranking as excellent for a wadeable Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI scores for the sites, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Catchment Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW02010001	6/20/00	WBM	59.8	318	26	5	6	10	71.38	22.01	83.33	71
DOW02010004	9/8/10	PRB	88	768	28	8	9	9	53.13	20.70	93.35	74
CFD0000073	6/30/09	SWG	57.1	1207	26	7	5	9	68.43	23.61	87.57	71
SED02010502	8/26/10	SED	88.01	641	28	8	8	9	51.17	37.59	92.66	70

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Harrods Creek (GNIS ID 493826) river miles 3.2 to 21.4, from Wolfpen Branch to Brush Creek, Ohio River Basin, Oldham County.

Receiving Water: Ohio River at river mile 595.5

Map: Please see the attached Map 8 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: two
KPDES permit #: KY0090107, permit name: Paramont Services Assn. Inc.
KPDES permit # KYG402523-001, permit name: Individual Residence

General Land Uses: Harrods Creek watershed above river mile 3.2 has a mixture of 42.4% agriculture (35.4% pasture/hay and 7% row crops), 38.8% forest, and 16.5% developed (9.6% developed open space and 4.3% low intensity) use. A 250-acre industrial site and the 6.2-acre Joe Clark Landfill are located on a tributary above the proposed exceptional water segment. Portions of the municipal separate storm sewer systems of Louisville and Jefferson County Metropolitan Sewer District, Oldham County Fiscal Court, and City of Peewee Valley are within this watershed. The land use adjacent to the proposed exceptional water segment consists of an excellent forested riparian zone, several hundred feet in width. A private preserve, Wolf Pen Branch Mill Farm is partially located within the lower watershed and adjacent to the proposed stream segment from river miles 3.35 to 4.3.

Flow Frequency: Harrods Creek at river mile 3.2 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.2 cfs and a mean annual flow of 116 cfs at river mile 3.2.

Biological Data Collection: Harrods Creek is located within the Bluegrass Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2009 (replicate samples) and the Total Maximum Daily Load (TMDL) program during 2012. The catchment areas above the sample reaches were 9.2 and 7.1 square miles, which are defined as wadeable streams. Harrods Creek from Wolfpen Branch to Brush Creek is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 72, 70, and 79 on the MBI, ranking as excellent, and a 69, ranking as good, for a wadeable Bluegrass stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	% ClngP	MBI
DOW12051001	10/27/09	PRB	68	300	33	15	4.48	44.67	1.33	65.00	72
DOW12051001	10/27/09	PRB	68	291	30	14	4.50	36.08	0.34	79.03	70
DOW12051001	10/27/09	PRB	68	3000	34	15	5.10	43.33	1.67	65.33	69
DOW08051001	6/29/12	TMDL	70.3	316	52	17	4.46	49.37	7.59	82.27	79

MBI Score	Narrative Translation for Wadeable Bluegrass Bioregion
≥70	Excellent
61-69	Good
41-60	Fair
21-40	Poor
0-20	Very Poor

Hell for Certain Creek (GNIS ID 512638) river miles 2.1 to 4.9, from Big Fork to Cucumber Branch, Kentucky River Basin, Leslie County.

Receiving Water: Middle Fork Kentucky River at river mile 65.4

Map: Please see the attached Map 9 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Hell for Certain Creek watershed above river mile 2.1 has 90.9% forest and 5.1% developed (mostly roads) use, with 0.2% agriculture (pasture/hay). Portions of the Daniel Boone National Forest, which allows public hunting, are contained within this watershed. Several gas wells are within the watershed, none of which are adjacent to the proposed exceptional water segment. The land use adjacent to the proposed exceptional water segment consists of a grassy floodplain with Hell For Certain Road running within this floodplain. The area beyond the floodplain is forested.

Flow Frequency: Hell for Certain Creek at river mile 2.1 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 9 cfs at river mile 2.1.

Biological Data Collection: Hell for Certain Creek is located within the Mountain Ichthyoregion. The fish community was sampled by the Central Fisheries District State Wildlife Grant (SWG) program during 2007. The catchment area above the sample reach was 6.4 square miles, which is defined as a wadeable stream. Hell for Certain Creek from Big Fork to Cucumber Branch is an Exceptional Water candidate because of an excellent fish community. It scored a 75 on the KIBI, ranking as excellent for a wadeable Mountain Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
CFD04046502	7/30/07	SWG	6.44	326	15	7	2	7	37.42	38.95	51.53	75

KIBI Score	Narrative Translation for Mountain Ichthyoregion
≥71	Excellent
59-70	Good
39-58	Fair
19-38	Poor
0-18	Very Poor

Jellico Creek (GNIS ID 512987) river miles 0.0 to 6.1, from mouth to Jacks Creek, Upper Cumberland River Basin, Whitley County.

Receiving Water: Cumberland River at river mile 566.6

Map: Please see the attached Map 10 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: Forty-six percent of the Jellico Creek watershed is within Tennessee. Of the land within Kentucky, 83.7% is forest, with 4.2% agriculture (pasture/hay) and 4.1% developed (mostly roads) use. Portions of the Daniel Boone National Forest, which allows public hunting, is within this watershed. The Little Rock Creek Property, a private 82-acre Kentucky Natural Lands Trust preserve, is also within this watershed. Numerous gas wells and several combined oil and gas wells exist within the watershed. Several areas of active or permitted surface and underground mines are in the watershed, none of which are adjacent to the proposed segment. The land use adjacent to the proposed exceptional water segment consists of a forested riparian buffer.

Flow Frequency: Jellico Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 2.9 cfs and a mean annual flow of 198.6 cfs at river mile 0.0.

Biological Data Collection: Jellico Creek is located within the Mountain Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Watershed Biological Monitoring (WBM) program during 2000 and 2005. The catchment area above the sample reach was 130.8 square miles, which is defined as a wadeable stream. Jellico Creek from its mouth to Jacks Creek is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored an 84 and 97 on the MBI, ranking as excellent for a wadeable Mountain stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	% ClngP	MBI
DOW02015001	9/20/00	WBM	130.8	864	68	26	5.06	52.31	7.41	63.77	84
DOW02015001	7/1/05	WBM	130.8	1059	79	31	4.24	72.52	2.46	81.49	97

MBI Score	Narrative Translation for Wadeable Mountain Bioregion
≥82	Excellent
75-81	Good
50-74	Fair
25-49	Poor
0-24	Very Poor

John Littles Branch (GNIS ID 495329) river miles 0.0 to 1.7, from mouth to headwaters, Kentucky River Basin, Breathitt County.

Receiving Water: North Fork Kentucky River at river mile 63.55

Map: Please see the attached Map 11 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The John Littles Branch watershed has 93.5% forest use, with 5.6 % developed (mostly roads). The land use adjacent to the proposed exceptional water segment consists of forest with roads running adjacent to the stream. One gas well is adjacent to the proposed exceptional water segment, near river mile 0.55.

Flow Frequency: John Littles Branch at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 2.9 cfs at river mile 0.0.

Biological Data Collection: John Littles Branch is located within the Mountain Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Intensive Survey (INT) program during 2007. The catchment area above the sample reach was 2.0 square miles, which is defined as a headwater stream. John Littles Branch from its mouth to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 91 on the MBI, ranking as excellent for a headwater Mountain stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	%ClngP	MBI
DOW04047006	4/3/07	INT	2	371	61	27	2.52	81.67	49.59	12.67	71.15	91

MBI Score	Narrative Translation for Headwater Mountain Bioregion
≥83	Excellent
72-82	Good
48-71	Fair
24-47	Poor
0-23	Very Poor

Leatherwood Creek (GNIS ID 496123) river miles 0.0 to 3.95, from mouth to headwaters, Upper Cumberland River Basin, Cumberland and Monroe Counties

Receiving Water: Marrowbone Creek at river mile 15.15

Map: Please see the attached Map 12 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Leatherwood Creek watershed has 87.5% forest use, with 6.3% agriculture (3% pasture/hay and 3.3% row crop) and 1.7% developed (mainly roads). Logging is evident in the headwaters of Bacon Branch, a tributary to Leatherwood Creek, and in small area in the southeastern portion of the watershed. The land use adjacent to the proposed exceptional water segment consists of a forested riparian buffer in the headwaters and agriculture use in the floodplain of the lower watershed (river miles 0.0 to 1.9). One domestic oil well is adjacent to the stream, near river mile 0.15.

Flow Frequency: Leatherwood Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 7.7 cfs at river mile 0.0.

Biological Data Collection: Leatherwood Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Probabilistic (PRB) program during 2010. The catchment area above the sample reach was 5.0 square miles, which is defined as a headwater stream. Leatherwood Creek from its mouth to its headwaters is an Exceptional Water candidate because of an excellent fish community. It scored a 78 on the KIBI, ranking as excellent for a headwater Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW02001013	4/9/10	PRB	5	275	19	4	6	8	58.55	29.09	47.27	78

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Little Meeting Creek (GNIS ID 496797) river miles 0.0 to 3.1, from mouth to loss of riparian buffer (near Unnamed Tributary), Green River Basin, Hardin County.

Receiving Water: Meeting Creek at river mile 5.25

Map: Please see the attached Map 13 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Little Meeting Creek watershed has a mixture of 45.5% forest and 47.4% agriculture (41.2% pasture/hay and 6.2% row crop) use, with 3.5% developed (mainly roads). There is one gas well in the watershed. The land use adjacent to the proposed exceptional water segment consists of a forested riparian buffer with agriculture beyond that buffer.

Flow Frequency: Little Meeting Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.3 cfs and a mean annual flow of 15.2 cfs at river mile 0.0.

Biological Data Collection: Little Meeting Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Intensive Survey (INT) program during 2008. The catchment area above the sample reach was 11.1 square miles, which is defined as a wadeable stream. Little Meeting Creek from its mouth to the loss of the forested riparian buffer (near an Unnamed Tributary) is an Exceptional Water candidate because of an excellent fish community. It scored a 73 on the KIBI, ranking as excellent for a wadeable Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW03008025	08/20/08	INT	11.1	281	23	7	1	7	49.82	32.74	59.78	73

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Little Negro Creek (GNIS ID 496817) river miles 0.0 to 2.45, from mouth to Unnamed Tributary, Kentucky River Basin, Rockcastle County.

Receiving Water: Negro Creek at river mile 0.8

Map: Please see the attached Map 14 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Little Negro Creek watershed has a mixture of 40.1% forest and 46% agriculture (44.9% pasture/hay and 1.2% row crop) use, with 9% developed (mainly roads). US-150 traverses the lower portion of the watershed and crosses Little Negro Creek at river mile 1.2. The land use adjacent to the proposed exceptional water segment consists of a grassy floodplain with Willailla Road (KY-70) running through this floodplain and forest or agriculture beyond that floodplain.

Flow Frequency: Little Negro Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.2 cfs and a mean annual flow of 14.3 cfs at river mile 0.0.

Biological Data Collection: Little Negro Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Central Fisheries District (CFD) during 2005. The catchment area above the sample reach was 10.25 square miles, which is defined as a wadeable stream. Little Negro Creek from its mouth to an Unnamed Tributary at river mile 2.45 is an Exceptional Water candidate because of an excellent fish community. It scored a 75 on the KIBI, ranking as excellent for a wadeable Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
SED04033510	8/8/05	CFD	10.25	365	25	3	3	10	48.77	29.58	94.79	75

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Nosey Creek (GNIS ID 499623) river miles 0.0 to 1.8, from mouth to Dry Run, Green River Basin, Grayson County.

Receiving Water: Nolin River at river mile 60.25

Map: Please see the attached Map 15 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Nosey Creek watershed has a mixture of 64% forest and 24.1% agriculture (23% pasture/hay and 1.1% row crop) use, with 3.6% developed (mainly roads). Mount Zion Road (CR-1048) crosses Nosey Creek at river mile 1.2. The land use adjacent to the proposed exceptional water segment consists of a mixture of pasture/hay, grassland and forested riparian zone.

Flow Frequency: Nosey Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.2 cfs and a mean annual flow of 11.7 cfs at river mile 0.0.

Biological Data Collection: Nosey Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Intensive Survey (INT) program during 2008. The catchment area above the sample reach was 8.4 square miles, which is defined as a wadeable stream. Nosey Creek from its mouth to Dry Run is an Exceptional Water candidate because of an excellent fish community. It scored an 86 on the KIBI, ranking as excellent for a wadeable Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW03026003	8/4/08	INT	8.4	243	19	7	4	8	$64.20	$24.69	$48.55	86

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Pryors Fork (GNIS ID 501406) river miles 0.0 to 5.4, from mouth to land use change (agriculture), Ohio River Basin, Trimble County.

Receiving Water: Corn Creek at river mile 4.5

Map: Please see the attached Map 16 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Pryors Fork watershed has a mixture of 69.8% forest and 21.5% agriculture (20.9% pasture/hay and 0.6% row crop) use, with 3.8% developed (mostly roads with some residential development in the area of Devin Road). Mount Pleasant Road (KY-625) runs in the floodplain adjacent to the stream from river mile 0.0 and crosses Pryors Fork at river mile 0.6. The land use adjacent to the proposed exceptional water segment consists of a grassy floodplain in the lower watershed to river mile 2.6 and an excellent forested riparian buffer above that point.

Flow Frequency: Pryors Fork at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 10 cfs at river mile 0.0.

Biological Data Collection: Pryors Fork is located within the Bluegrass Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Reference Reach (REF) program during 2001, 2002, and 2008. The catchment areas above the sample reaches were 7.5 and 8.0 square miles, which are defined as wadeable streams. Pryors Fork from its mouth to the land use change (agriculture) is an Exceptional Water candidate because of an excellent fish community. It scored 50 (Good/Excellent[1]) during 2001 and a 65 during 2002 and a 58 during 2009, ranking as excellent for a Bluegrass Ichthyoregion stream. Fish sampling metrics and final KIBI scores for the sites, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW08057001	4/24/01	REF	7.5	341	8	3		4	34.90	53.66	38.41	50
DOW08057002	4/11/02	REF	8	424	11	4		6	58.49	20.28	33.01	65
DOW08057002	6/1/09	REF	8	110	9	3		5	51.82	30.90	37.27	58

KIBI Score	Narrative Translation for Bluegrass Ichthyoregion
≥52	Excellent
47-51	Good
31-46	Fair
16-30	Poor
0-15	Very Poor

[1]When a KIBI score falls close (± 2 points) to the narrative classification thresholds, the KIBI document recommends that the classification contain both categories (e.g., Excellent/Good).

Right Fork Beehive Branch (GNIS ID 514928) river miles 0.55 to 1.8, from residential area to headwaters, Kentucky River Basin, Perry County.

Receiving Water: Beehive Branch at river mile 1.05

Map: Please see the attached Map 17 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Right Fork Beehive Branch watershed above river mile 0.55 has a mixture of 82.4% forest and 14.5% grassland use, with 3.2% developed (roads). Right Fork Beehive Road (CR-15.35) runs in the floodplain adjacent to the stream for most of its length. The watershed has active permitted underground mine boundaries and some permitted surface mine boundaries within it. Three gas wells and one combined oil and gas well are in the watershed, all near the stream segment. The land use adjacent to the proposed exceptional water segment consists of a grassy floodplain with road and forest beyond that floodplain.

Flow Frequency: Right Fork Beehive Branch at river mile 0.55 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 1.5 cfs at river mile 0.55.

Biological Data Collection: Right Fork Beehive Branch is located within the Mountain Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Intensive Survey (INT) program during 2008. The catchment area above the sample reach was 1.03 square miles, which is defined as a headwater stream. Right Fork Beehive Creek from the residential area at river mile 0.55 to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored an 85 on the MBI, ranking as excellent for a headwater Mountain stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	%ClngP	MBI
DOW04055008	5/7/08	INT	1.03	439	41	22	2.63	86.56	60.36	8.43	64.46	85

MBI Score	Narrative Translation for Headwater Mountain Bioregion
≥83	Excellent
72-82	Good
48-71	Fair
24-47	Poor
0-23	Very Poor

Rockhouse Creek (GNIS ID 502188) river miles 0.0 to 4.8, from mouth to East Fork/West Fork of Rockhouse Creek, Tennessee River Basin, Calloway County.

Receiving Stream: Clarks River at river mile 51.8

Map: Please see the attached Map 18 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Rockhouse Creek watershed has a mixture of 65.5% agriculture (58.3% row crop and 7.2% pasture/hay) and 24.5% forest use, with 9.1% developed (roads and some residential areas). US-641 runs north and south in the far eastern portion of the watershed and crosses the proposed exceptional water segment at river mile 2.9. One sand and gravel quarry is located on a tributary to the proposed exceptional water segment. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer with row cropping beyond that buffer.

Flow Frequency: Rockhouse Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.5 cfs and a mean annual flow of 36.6 cfs at river mile 0.0.

Biological Data Collection: Rockhouse Creek is located within the Mississippi Valley/Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2005. The catchment area above the sample reach was 22.4 square miles, which is defined as a wadeable stream. Rockhouse Creek from its mouth to the East Fork/West Fork of Rockhouse Creek is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 64 on the MBI, ranking as excellent for a headwater Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	%ClngP	MBI
DOW09007010	6/8/05	PRB	22.4	557	48	12	5.38	26.93	26.93	78.81	64

MBI Score	Narrative Translation for Headwater Mississippi Valley/Interior River Lowland Bioregion
≥63	Excellent
56-62	Good
35-55	Fair
19-34	Poor
0-18	Very Poor

Sand Lick Creek (GNIS ID 502930) river miles 0.0 to 1.5, from mouth to Unnamed Tributary, Upper Cumberland River Basin, Cumberland and Adair Counties

Receiving Water: Crocus Creek at river mile 14.2

Map: Please see the attached Map 19 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Sand Lick Creek watershed has 88.2% forest use, with 6.3% agriculture (5.3% pasture/hay and 1% row crop) and 1.2% developed (mostly roads). Numerous oil wells exist in the watershed along with one gas well. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer with an unimproved road and pasture/grassland beyond that buffer.

Flow Frequency: Sand Lick Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 8.7 cfs at river mile 0.0.

Biological Data Collection: Sand Lick Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2010. The catchment area above the sample reach was 4.29 square miles, which is defined as a headwater stream. Sand Lick Creek from its mouth to an Unnamed Tributary at river mile 1.5 is an Exceptional Water candidate because of an excellent fish community. It scored a 73 on the KIBI, ranking as excellent for a headwater Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW02001015	5/19/10	PRB	4.29	218	13	4	4	5	55.96	28.44	39.90	73

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Spring Creek (GNIS ID 515610) river miles 0.0 to 1.8, from mouth to Little Spring Creek, Kentucky River Basin, Clay County.

Receiving Water: Red Bird River at river mile 28.1

Map: Please see the attached Map 20 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Spring Creek watershed has 94.1% forest use, with 2.6% developed (mainly unimproved roads). Much of the watershed is within the Daniel Boone National Forest, which allows public hunting. The Redbird Crest Trail crosses the uppermost portion of the watershed. Several gas and combined oil and gas wells exist in the watershed. The upper watershed has permitted surface mine boundaries. The land use adjacent to the proposed exceptional water segment consists of a forested riparian buffer and grassland mix with an unimproved road from its mouth to river mile to 0.7 and a forested riparian buffer above that river mile.

Flow Frequency: Spring Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 8.2 cfs at river mile 0.0.

Biological Data Collection: Spring Creek is located within the Mountain Ichthyoregion. The fish community was sampled by the Central Fisheries District State Wildlife Grant (SWG) program during 2007. The catchment area above the sample reach was 5.71 square miles, which is defined as a headwater stream. Spring Creek from its mouth to Little Spring Creek is an Exceptional Water candidate because of an excellent fish community. It scored a 72 on the KIBI, ranking as excellent/good[1] for a headwater Mountain Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
CFD04052501	5/9/07	SWG	5.71	125	11	5	2	5	48.80	29.60	23.20	72

KIBI Score	Narrative Translation for Mountain Ichthyoregion
≥71	Excellent
59-70	Good
39-58	Fair
19-38	Poor
0-18	Very Poor

[1]When a KIBI score falls close (± 2 points) to the narrative classification thresholds, the KIBI document recommends that the classification contain both categories (e.g., Excellent/Good).

Sulphur Creek (GNIS ID 504731) river miles 0.5 to 2.8, from Little Sulphur Creek to Baxter Branch, Upper Cumberland River Basin, Monroe County

Receiving Water: Cumberland River at river mile 387.6

Map: Please see the attached Map 21 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: Sulphur Creek watershed above river mile 0.5 has a mixture of 71.7% forest and 18.3% agriculture (17.4% pasture/hay and 0.9% row crop) use, with 3.4% developed (mostly roads). A small portion of the Capp Harlan Industrial Park exists in the headwaters of the watershed. A few gas and oil wells are scattered throughout the watershed. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer with row cropping or pasture in the floodplain. Cloyd Williams Road runs within this floodplain.

Flow Frequency: Sulphur Creek at river mile 0.5 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.1 cfs and a mean annual flow of 23.5 cfs at river mile 0.5.

Biological Data Collection: Sulphur Creek is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Southwestern Fisheries District (SWD) during 2004. The catchment area above the sample reach was 15 square miles, which is defined as a wadeable stream. Sulphur Creek from Little Sulphur Creek to Baxter Branch is an Exceptional Water candidate because of an excellent fish community. It scored a 77 on the KIBI, ranking as excellent for a headwater Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
SWD02001510	8/19/04	SWD	15	192	20	6	5	6	58.33	16.14	75.00	77

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

Tradewater River (GNIS ID 505460) river miles 96.7 to 98.5, from Caney Creek to Buffalo Creek, Tradewater River Basin, Hopkins County.

Receiving Water: Ohio River at river mile 873.5

Map: Please see the attached Map 22 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Tradewater River above river mile 96.7 has a mixture of 70.1% forest and 19.2% agriculture (13.1% pasture/hay and 6.1% row crop) use, with 2.4% developed (mostly roads). Several permitted surface mine boundaries are within the watershed, none along the proposed exceptional water segment. A few gas and oil wells are within the watershed. Portions of the Tradewater Wildlife Management Area and the Pennyrille State Forest, both of which allow public hunting, are contained within the lower western part of the watershed. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer from river mile 97.2 to river mile 97.5, with agriculture beyond that buffer, and an excellent forested riparian buffer along the rest of the proposed exceptional water segment.

Flow Frequency: Tradewater River at river mile 96.7 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 139.1 cfs at river mile 96.7.

Biological Data Collection: Tradewater River is located within the Mississippi Valley/Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2006. The catchment area above the sample reach was 109.3 square miles, which is defined as a wadeable stream. Tradewater River from Caney Creek to Buffalo Creek is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 59 on the MBI, ranking as excellent for a wadeable Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	%ClngP	MBI
DOW10014021	6/27/06	PRB	109.3	1112	56	12	6.91	37.05	6.38	33.45	59

MBI Score	Narrative Translation for Wadeable Mississippi Valley/Interior River Lowland Bioregion
≥58	Excellent
48-57	Good
24-47	Fair
13-23	Poor
0-12	Very Poor

Tygarts Creek (GNIS ID 516088) river miles 36.0 to 45.4, from just downstream of Lost Creek to Leatherwood Branch, Tygarts River Basin, Greenup County.

Receiving Water: Ohio River at river mile 353

Map: Please see the attached Map 23 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Tygarts Creek watershed above river mile 36.0 has a mixture of 67.3% forest, 14.4% agriculture (14.2% pasture/hay and 0.2% row crop), and 8% developed use. There are three water withdrawals, several oil and gas wells, several quarries, and numerous permitted outfalls in the watershed, all above the proposed exceptional water segment. The Tygarts State Forest and Carter Caves State Resort Park, which allow public hunting, are located in the middle of the watershed. The city of Olive Hill and the Olive Hill City Dump, along with I-64 and US-60 are located near the mid to upper portion of this watershed. There are several permitted surface mine boundaries within the watershed, three of which are adjacent to the proposed exceptional water segment. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer with agriculture and KY HWY-2 and KY-7 in the floodplain.

Flow Frequency: Tygarts Creek at river mile 36.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.3 cfs and a mean annual flow of 270.3 cfs at river mile 36.0.

Biological Data Collection: Tygarts Creek is located within the Mountain Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2012. The catchment area above the sample reach was 225.2 square miles, which is defined as a wadeable stream. Tygarts Creek from just downstream of Lost Creek to Leatherwood Branch is an Exceptional Water candidate because of an excellent fish community. It scored an 80 and 72 on the KIBI, ranking as excellent and excellent/good[1] for a headwater Mountain Ichthyoregion stream. Fish sampling metrics and final KIBI scores for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW11004005	8/21/12	PRB	225.24	611	29	10	9	16	59.25	17.02	94.43	80
DOW11004005	8/21/12	PRB	225.24	390	23	10	8	13	58.46	9.23	91.79	72

KIBI Score	Narrative Translation for Mountain Ichthyoregion
≥71	Excellent
59-70	Good
39-58	Fair
19-38	Poor
0-18	Very Poor

[1]When a KIBI score falls close (± 2 points) to the narrative classification thresholds, the KIBI document recommends that the classification contain both categories (e.g., Excellent/Good).

<u>Unnamed Tributary of Big Run Branch</u> (GNIS ID none) river miles 0.0 to 3.9, from mouth to loss of riparian zone and Unnamed Tributary from the South West, Green River Basin, Grayson County.

Receiving Water: Big Run Branch at river mile 2.3

Map: Please see the attached Map 24 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Unnamed Tributary of Big Run Branch watershed has a mixture of 56.1% agriculture (53.5% pasture/hay and 2.7% row crop), 33% forest, and 7.3% developed (roads and residential areas) use. Three oil and one gas wells and two limestone quarries exist within the watershed. Part of the Rough River Lake Wildlife Management Area, which allows public hunting, is in the lower portion of the watershed near stream river miles 0.0 to 0.35. The land use adjacent to the proposed exceptional water segment consists of a good riparian buffer with agriculture or residential areas beyond that buffer.

Flow Frequency: Unnamed Tributary of Big Run Branch at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.1 cfs and a mean annual flow of 5.7 cfs at river mile 0.0.

Biological Data Collection: Unnamed Tributary of Big Run Branch is located within the Pennyroyal Ichthyoregion. The fish community was sampled by the Kentucky Division of Water Intensive Survey (INT) program during 2008. The catchment area above the sample reach was 4.1 square miles, which is defined as a headwater stream. Unnamed Tributary of Big Run Branch from its mouth to the loss of riparian zone and Unnamed Tributary from the South West at river mile 3.1 is an Exceptional Water candidate because of an excellent fish community. It scored a 69 on the KIBI, ranking as excellent/good[1] for a headwater Pennyroyal Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW03008024	5/22/08	INT	4.1	182	11	4	2	4	54.40	19.78	40.65	69

KIBI Score	Narrative Translation for Pennyroyal Ichthyoregion
≥67	Excellent
53-66	Good
35-52	Fair
17-34	Poor
0-16	Very Poor

[1]When a KIBI score falls close (± 2 points) to the narrative classification thresholds, the KIBI document recommends that the classification contain both categories (e.g., Excellent/Good).

<u>Unnamed Tributary of Unnamed Tributary of Sulphur Creek</u> (GNIS ID none) river miles 0.0 to 0.7, from mouth to end of forested reach, Salt River Basin, Anderson County.

Receiving Water: river mile 0.15 of Unnamed Tributary at river mile 0.75 of Sulphur Creek

Map: Please see the attached Map 25 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Unnamed Tributary of Unnamed Tributary of Sulphur Creek watershed has a mixture of 74.6% forest, 16.4% agriculture (all pasture/hay) and 6.6% developed (mainly roads) use. The Martha Layne Collins-Bluegrass Parkway crosses the watershed at river mile 0.7. The land use adjacent to the proposed exceptional water segment consists of forest.

Flow Frequency: Unnamed Tributary of Unnamed Tributary of Sulphur Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 0.7 cfs at river mile 0.0.

Biological Data Collection: Unnamed Tributary of Unnamed Tributary of Sulphur Creek is located within the Bluegrass Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Total Maximum Daily Load (TMDL) program during 2012. The catchment area above the sample reach was 0.6 square miles, which is defined as a headwater stream. Unnamed Tributary of Unnamed Tributary of Sulphur Creek from its mouth to the end of the forested reach at river mile 0.7 is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 60 on the MBI, ranking as excellent for a headwater Bluegrass stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% Ephem	% C+O	%ClngP	MBI
DOW12023026	3/27/12	TMDL	0.6	351	38	13	4.67	62.39	4.27	6.55	54.13	60

MBI Score	Narrative Translation for Headwater Bluegrass Bioregion
≥58	Excellent
51-57	Good
39-50	Fair
19-38	Poor
0-18	Very Poor

West Fork Clarks River (GNIS ID 506426) river miles 17.2 to 20.1, from Panther Creek to Soldier Creek, Tennessee River Basin, Graves County.

Receiving Water: Clarks River at river mile 13.1

Map: Please see the attached Map 26 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The West Fork Clarks River watershed above river mile 17.2 has a mixture of 57.5% agriculture (39.3% row crop and 18.2% pasture/hay) and 35.9% forest use, with 4.9% developed. One quarry and the Murray City Landfill are located in the upper portion of the watershed. The land use adjacent to the proposed exceptional water segment consists of a narrow forested riparian buffer with agriculture use beyond that buffer. The Jullian M. Carroll Parkway crosses the proposed exceptional water segment at river mile 18.8.

Flow Frequency: West Fork Clarks River at river mile 17.2 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 2.3 cfs and a mean annual flow of 128 cfs at river mile 17.2.

Biological Data Collection: West Fork Clarks River is located within the Mississippi Valley/ Interior River Lowland Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Probabilistic Monitoring (PRB) program during 2005. The catchment area above the sample reach was 89.8 square miles, which is defined as a wadeable stream. West Fork Clarks River from Panther Creek to Soldier Creek is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored a 64 on the MBI, ranking as excellent for a wadeable Mississippi Valley/Interior River Lowland stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	%ClngP	MBI
DOW09010017	7/13/05	PRB	89.6	498	57	14	5.69	36.55	20.88	51.20	64

MBI Score	Narrative Translation for Wadeable Mississippi Valley/Interior River Lowland Bioregion
≥58	Excellent
48-57	Good
24-47	Fair
13-23	Poor
0-12	Very Poor

White Oak Creek (GNIS ID 516320) river miles 1.0 to 5.75, from Little White Oak Creek to headwaters, Upper Cumberland River Basin, Laurel County.

Receiving Water: Sinking Creek at river mile 9.95

Map: Please see the attached Map 27 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The White Oak Creek watershed above river mile 1.0 has a mixture of 69.5% forest, 12.7% developed, and 10.2% agriculture (pasture/hay) use. Portions of the Daniel Boone National Forest, which allows public hunting, is within this watershed. Several permitted surface mine boundaries are located within the watershed. The Hal Rogers Parkway traverses the uppermost portion of the watershed. A high intensity developed area is located in the headwaters of East Prong White Oak Creek, a tributary to White Oak Creek. The land use adjacent to the proposed exceptional water segment consists of an excellent forested riparian buffer.

Flow Frequency: White Oak Creek at river mile 1.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.1 cfs and a mean annual flow of 9.8 cfs at river mile 1.0.

Biological Data Collection: White Oak Creek is located within the Mountain Bioregion. The macroinvertebrate community was sampled by the Kentucky Division of Water Nonpoint Source (NPS) program during 2006 and by the Daniel Boone National Forest (DBF) and the US Fish and Wildlife Service (FWS) in 2012. The catchment area above the sample reaches were 6.9 and 6.64 square miles, which are defined as wadeable streams. White Oak Creek from Little White Oak Creek to its headwaters is an Exceptional Water candidate because of an excellent macroinvertebrate community. It scored an 87 and 82 on the MBI, ranking as excellent, and a 67, ranking as fair, for a wadeable Mountain stream. Macroinvertebrate sampling metrics and final MBI score, along with a MBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	Tot Ind	G-TR	G-EPT	mHBI	m% EPT	% C+O	% ClngP	MBI
DOW02019005	4/17/06	NPS	6.9	283	45	20	3.89	74.20	5.30	87.27	87
DBF02019705	8/14/12	DBF	6.64	43	13	7	4.30	55.81	2.33	90.69	67
DOW02019005	10/4/12	FWS	6.9	148	40	16	3.87	71.62	6.08	95.94	82

MBI Score	Narrative Translation for Wadeable Mountain Bioregion
≥82	Excellent
75-81	Good
50-74	Fair
25-49	Poor
0-24	Very Poor

Wild Dog Creek (GNIS ID 516358) river miles 0.0 to 0.6, from mouth to Dry Fork, Kentucky River Basin, Owsley County.

Receiving Water: Sturgeon Creek at river mile 12.25

Map: Please see the attached Map 28 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Wild Dog Creek watershed has 79.1% forest use, with 5.5% developed (mostly roads) and 3.8% agriculture (pasture/hay). Portions of the Daniel Boone National Forest, which allows public hunting, are located within this watershed. Several permitted surface mine boundaries are located in the headwaters of the watershed. The land use adjacent to the proposed exceptional water segment is forested with an unimproved road running along its length.

Flow Frequency: Wild Dog Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 11.7 cfs at river mile 0.0.

Biological Data Collection: Wild Dog Creek is located within the Mountain Ichthyoregion. The fish community was by the Central Fisheries District State Wildlife Grant (SWG) program during 2007. The catchment area above the sample reach was 8.8 square miles, which is defined as a wadeable stream. Wild Dog Creek from its mouth to Dry Fork is an Exceptional Water candidate because of an excellent fish community. It scored an 80 on the KIBI, ranking as excellent for a wadeable Mountain Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
CFD04038503	5/11/07	SWG	8.819	292	18	8	4	8	44.178	39.04	30.47	80

KIBI Score	Narrative Translation for Mountain Ichthyoregion
≥71	Excellent
59-70	Good
39-58	Fair
19-38	Poor
0-18	Very Poor

Willow Creek (GNIS ID 506866) river miles 0.0 to 6.7, from mouth to large 2nd order Unnamed Tributary, Licking River Basin, Bracken County.

Receiving Water: North Fork Licking River at river mile 2.3

Map: Please see the attached Map 29 for the relative location of the proposed stream segment.

KPDES dischargers to stream segment: None

General Land Uses: The Willow Creek watershed has a mixture of 73.5% forest and 17.7% agriculture (17.4% pasture/hay and 0.3% row crop) use, with 3.9% developed (mostly roads). The land use adjacent to the proposed exceptional water segment is forested.

Flow Frequency: Willow Creek at river mile 0.0 is perennial, with natural flow expected year-round. It has a 7Q10 flow of 0.0 cfs and a mean annual flow of 19 cfs at river mile 0.0.

Biological Data Collection: Willow Creek is located within the Bluegrass Ichthyoregion. The fish community was sampled by the Northeastern Fisheries District (NED) program during 2005. The catchment area above the sample reach was 14 square miles, which is defined as a wadeable stream. Willow Creek from its mouth to the large 2nd order Unnamed Tributary at river mile 6.7 is an Exceptional Water candidate because of an excellent fish community. It scored a 59 on the KIBI, ranking as excellent for a wadeable Bluegrass Ichthyoregion stream. Fish sampling metrics and final KIBI score for the site, along with a KIBI score to narrative translation, are in the tables below.

Station	Collection Date	Collector	Area (mi^2)	TNI	NAT	DMS	INT	SL	% INSCT	% TOL	% FHW	KIBI
DOW05023003	8/18/05	NED	14	537	15	1	2	5	69.09	26.62	99.44	59

KIBI Score	Narrative Translation for Bluegrass Ichthyoregion
≥52	Excellent
47-51	Good
31-46	Fair
16-30	Poor
0-15	Very Poor